

MAPPING GRADE 6 SCIENCE INSTRUCTION

Concept: The Nature of Matter

PWC Objective: 6.4

The student will investigate and understand that all matter is made up of atoms. Key concepts include:

- subatomic particles (electrons, protons, neutrons) **(SOL 6.4a)**
- differences in atoms of different elements **(SOL 6.4b)**
- chemical symbols **(SOL 6.4c)**
- combining atoms **(SOL 6.4d)**
- chemical formulas **(SOL 6.4e)**
- chemical equations **(SOL 6.4f)**
- elements that comprise solid Earth, living matter, oceans, and atmosphere **(SOL 6.4g)**

What Students Should Know (Critical Attributes)	What Students Should Be Able To Do (Essential Skills)
<p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • What are the components of the atom? • How can matter be classified? • What are the properties of matter? • What changes can matter undergo? <p><u>Critical Attributes:</u></p> <p>6.4a Every object and substance on Earth is made of matter. Matter is made of small particles called atoms.</p> <p>6.4a Atoms are made of smaller components called sub-atomic particles. These include electrons, protons, and neutrons. Protons and neutrons make up the nucleus of the atom.</p> <p>6.4b An element is a form of matter made up of one type of atom. The atoms of an element are basically alike, though the number of neutrons may vary. The atoms of one element and another element differ in the number of protons.</p>	<ul style="list-style-type: none"> • Create and interpret a simplified model of the structure of an atom. • Compare and contrast the atomic structure of two different elements.

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What Students Should Know (Critical Attributes)	What Students Should Be Able To Do (Essential Skills)
<p>6.4c Elements are represented by chemical symbols, which can be found on the periodic table.</p> <p>6.4d When two or more elements combine, a compound is formed. Compounds consist of atoms joined by chemical bonds.</p> <p>6.4e Compounds can be represented by chemical formulas. Each different element in the compound is represented by its unique symbol. The number of each type of element in the compound (other than 1) is represented by a small number to the right and slightly below the element symbol called a subscript.</p> <p>6.4f Chemical questions can be used to model chemical changes illustrating how elements become rearranged in a chemical reaction.</p> <p>6.4g A limited number of elements, including silicon, aluminum, iron, sodium, calcium, potassium, magnesium, hydrogen, oxygen, nitrogen, and carbon form the largest portion of the Earth's crust, living matter, the oceans, and the atmosphere.</p>	<ul style="list-style-type: none">• Explain that elements are represented by symbols. • Identify the name and number of each element present in simple molecular compounds such as O₂, H₂O, CO₂, or CaCO₂. • Model a simple chemical change with an equation and account for all atoms. Distinguish the types of elements and number of each element in the chemical equation. • Name some of the predominant elements found in the atmosphere, the oceans, living matter, and in Earth's crust. <p>Teacher note: The concept of atoms, elements, molecules, and compounds should have been briefly introduced in Grade 5, but not in any amount of detail beyond the notion of levels of organization in matter. Grade Six introduces subatomic particles for the first time.</p>